

Amendments to the Drawings:

The attached sheet of drawings includes changes to Figures 5 and 15. These sheets include Figures 6 and 13 and 14. In Figure 5, the reference numerals 28 and 29 has been added; and in Figure 15, the reference numerals 22 and 23 have been added.

Attachment: Replacement Sheets

REMARKS

By the foregoing amendment, Claims 1 through 17 have been cancelled, and new Claims 18 through 25 have been added. Accordingly, Claims 18 through 25 are currently pending in this application.

In response to the Examiner's request for the Applicants' cooperation in correcting minor errors in the specification, a substitute specification is submitted herewith.

The drawings have been objected to under 37 C.F.R. §1.83(a) on the grounds that they must show every feature of the invention specified in the claims. In response to this ground of objection, Applicants have submitted replacement sheets containing Figures 5, 6, 13, 14 and 15 which include additional reference numerals designating certain features recited in the claims. In addition, the specification has been amended to incorporate references correlating the disclosure with the respective figures of the drawing, as well as additional reference numerals, identifying those features of the invention mentioned in the specification and already depicted in the drawings. Based on the submission of the replacement sheets as well as the amendment of the specification, and taking into consideration the amendment of the claims as set forth above, Applicants respectfully submit that all elements of the claimed

invention are now shown in the drawings. Accordingly, reconsideration and withdrawal of this ground of objection are respectfully requested.

Claims 1, 2 and 6-17 have been rejected under 35 U.S.C. §112, second paragraph for allegedly failing to particularly point out and distinctly claim the invention. This ground of rejection has been rendered moot by the cancellation of Claims 1 through 17 and the submission of new Claims 18 through 25. Nevertheless, in order to advance the prosecution of this application, Applicants have reviewed new Claims 18 through 25 in view of the Examiner's observations regarding Claims 1, 2 and 6, and believe that the formal issues cited by the Examiner have been addressed and resolved.

In particular, with regard to the Examiner's comment at the bottom of page 3 and carrying over to the top of page 4 of the Office Action regarding the elected species as depicted in Figure 6, Applicants note that the present application contains four species, depicted in Figures 6 through 9 (also shown in Figures 10 through 14, as well). In Figure 6, for example, the probing portion 21 is shown as being round, while it is elliptical in Figure 7, square with rounded corners in Figure 8, and square with chamfered corners in Figure 9. Thus, the respective species are differentiated by the shape of the probing portion 21.

As noted in the Brief Description of the Invention, each of the respective species in Figures 6 through 9 illustrates a portion of the overall electronic circuit substrate, which is shown, for example in Figure 5. Figure 5, which is

generic and shows the entire device, includes one probing portion 21 which is round, while the remainder of the probing portions 21 are square with rounded corners. By the selection of the species illustrated in Figure 6, Applicants are not precluded from claiming the entire device, as shown in Figure 5, provided that each claim which is maintained of record reads on the elected embodiment of Figure 6. Applicants respectfully submit that the latter requirement is satisfied by those claims which are currently of record.

Claims 1, 2 and 6-17 have been rejected under 35 U.S.C. §103(a) as unpatentable over Eldridge et al (Published U.S. Patent Application No. 2002/0132501 A1) in view of Zenhausern et al (Published U.S. Patent Application No. 2004/0011650 A1). This ground of rejection has been rendered moot by the cancellation of Claims 1 through 17. Nevertheless, in order to advance the prosecution of this application, Applicants note that all claims which remain of record in this application distinguish over both Eldridge et al and Zenhausern et al, whether considered separately or in combination.

The present invention is directed to a structure for an electronic device having electronic components which are mounted on a surface thereof and are connected by surface mounted conductors. In order to prevent corrosion of such a device which, in certain automotive applications, is inserted into an environment of highly corrosive gases, its surface, including the electronic

components and conductors, is coated with a non-conductive material such as glass or a resin.

In order to provide the ability to access the electronic components mounted on the surface of the substrate for the purpose of calibrating or adjusting them, openings are provided through the non-conductive glass or resin coating, so that access can be obtained to the conductors, in order to communicate electronically with the components mounted on the substrate. The latter openings, however, create the possibility that the corrosive gases in the surrounding environment will be able to penetrate to and corrode the conductors on the surface of the substrate, particularly where the conductors are made of silver or a silver alloy.

In order to prevent such corrosion, the conductors, in the area of the openings, are generally covered with an overcoating of a solder or metallic paste. However, if the openings themselves are square, while the overcoating solder is in a generally rounded shape, uncovered portions of the opening will be left at the corners, where the gases can contact the underlying conductors, and corrosion will result. (See Exhibit 1, below.)

Accordingly, a feature of the present invention resides in the proposition that, in order to prevent such corrosion of electronic elements, such as conductors, resistors, capacitors, etc., the shape of the openings formed in the protective coating substantially or entirely eliminates such corner areas. As

shown in Exhibit 1 below, when a rectangular opening is formed in the insulating coating, the corners of the opening may be left "unwetted" (that is, not covered in intimate contact) with a solder material or a conductive metal paste. Particularly if the solder whose main component is tin or metal paste (for which wettability with the conductor wires is not good), the exposed corner portions are easily corroded by a corrosive gas or substance. According to the present invention, however, the shape of the openings is circular, elliptical, square with rounded corners or square with chamfered corners, as shown in Exhibit 2 below:

Exhibit 1

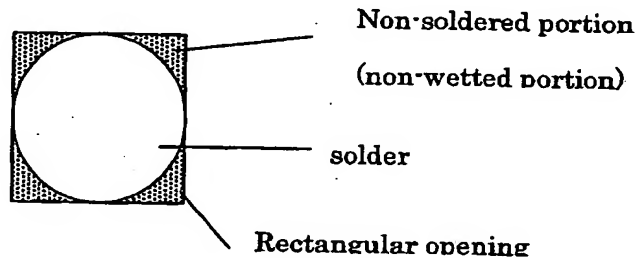
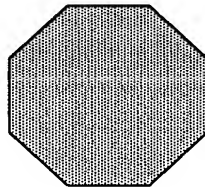


Exhibit 2



So long as the opening has no sharp corners, the metal or solder paste can be spread over the entire opening, eliminating the unwetted portion as shown in Exhibit 2. This structure of the opening is very important when a solder material is used which has poor "wettability" with the conductor wires or other electronic components. Since the solder, whose main component is tin, has poor wettability, the shape of the openings of the present invention is pivotal, especially when the electronic device is installed in a corrosive atmosphere, such as in an automobile.

Applicants respectfully submit that the foregoing features of the invention, pertaining to the shape of the opening in the protective non-conductive covering as described above (and as recited in the claims), is neither taught nor suggested by the Eldridge et al patent application. Claim 18, for example, recites that the openings through the overcoat layer are formed in a shape having no square corners and no acute angle corners. This aspect of the invention, however, is not addressed in Eldridge et al, nor is it inherent in the disclosure of Eldridge et al. In particular, Eldridge et al fails to suggest any particular shape for the openings, and hence includes no disclosure that the openings are configured without square or acute angle corners.

The Briscoe et al patent, on the other hand, is cited as an example of a multilayer device. Accepting this characterization as correct, Briscoe et al fails to teach or suggest the feature described previously regarding the shape of the

openings of the probing portions, as recited in the claims of the present application. Moreover, the invention in Briscoe et al is generally addressed to a flow cell for a bioreaction, and fails to suggest any modification of the Eldridge et al structure, which would replicate the present invention.

In light of the foregoing remarks, this application should be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #056208.52613US).

Respectfully submitted,



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